

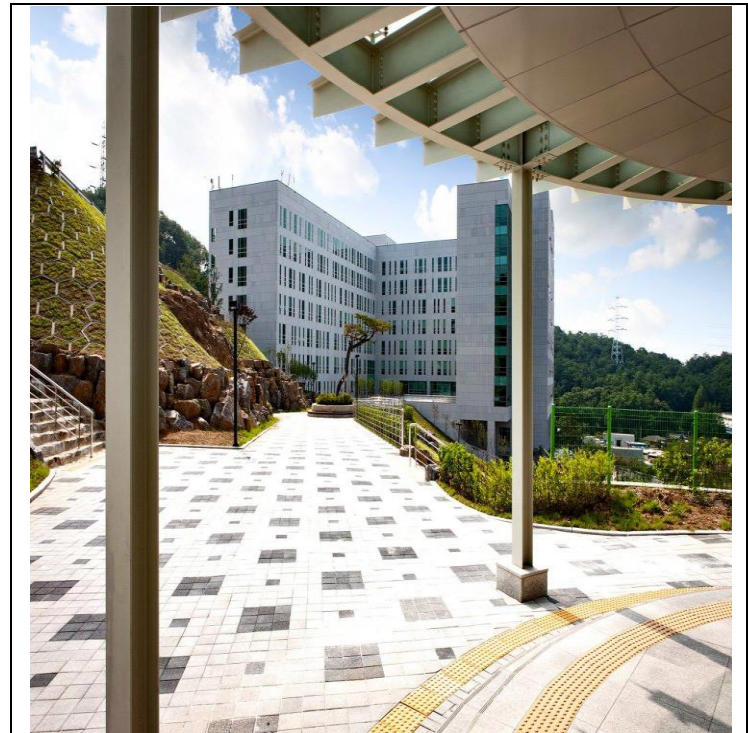


Effect of Weight-bearing Pattern and Calcaneal Taping on Heel Width and Plantar Pressure in Standing

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Abstract : Plantar heel pain is caused by micro-damage due to repetitive high stress on the heel pad in sustained weight-bearing activities. It was hypothesized that increased weight-bearing stress to the heel would lead to increased heel width and plantar pressure, and that both could be decreased by calcaneal taping. The purpose of this study was to assess the effects of weight-bearing pattern and calcaneal taping on heel width and plantar pressure in standing. Fifteen healthy subjects with normal feet participated in this study. Inclusion criteria were as follows: (1) no gait disturbance or foot pain; (2) normal ankle joint range of motion; and (3) no foot deformity. Heel width was measured using a digital caliper, and a Pedoscan was used to measure heel plantar pressure in standing. Participants were instructed to stand in three weight-bearing patterns (anterior, middle, and posterior weight-bearing) before and after calcaneal taping. In a standing posture, plantar pressure was recorded for 5 seconds, and heel width was measured using the digital caliper at the thickest point under the posterior margin of the malleoli. Heel width and plantar pressure were measured three times before and three times after calcaneal taping, with the three weight-bearing patterns applied in random order. A 2 (non-taping vs. taping) \times 3 (anterior, middle, posterior weight-bearing) two-way repeated ANOVA with Bonferroni post hoc correction was used to assess differences in heel width and plantar pressure. The results revealed a significant main effect of weight-bearing pattern ($p = 0.001$), but not of calcaneal taping ($p = 0.058$). Greater weight-bearing applied to the heel resulted in increased heel width (anterior = 10.9 mm; middle = 10.8 mm; posterior = 13.1 mm) and plantar pressure (anterior = 9.9 N/cm²; middle = 10.7 N/cm²; posterior = 12.6 N/cm²). In standing, a posterior weight-bearing pattern increases heel width due to side-to-side shifting of the plantar heel pad, and this increases the heel plantar pressure. Therefore, to prevent high stress on the heel pad and plantar heel pain, it is important to refrain from posterior weight-bearing when standing during activities of daily living.



Biography : Dr. Jung is a Professor in the Department of Physical Therapy at Joongbu University. He received his B.S., M.Sc., and PhD in Physical Therapy from Yonsei University, in 1999, 2003, and 2010 respectively. He specializes in managing people with foot problems caused by excessive stress during weight-bearing activities. His primary goal is to reduce the incidence of skin breakdown and lower- extremity amputations in this high-risk population.

Publications :

1. Reliability of a New Test of Levator Scapula Muscle Length
2. Effect of Calcaneal Taping on Peak Plantar Pressure of Forefoot and Rearfoot during Gait
3. Reliability of a Novel Test for Teres Major Muscle Length
4. Effects of Modified Cross-body Stretching on Range of Motion in Glenohumeral Joint
5. A comparison in the muscle activity of the abductor hallucis and the medial longitudinal arch angle during toe curl and short foot exercises

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